

BIPHENYL COMPOUND AND ITS USE

Publication number: JP2001302605 (A)

Publication date: 2001-10-31

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Applicant(s): SUMITOMO CHEMICAL CO

Classification:

- International: C07D327/06; A01N37/22; A01N43/08; A01N43/10; A01N43/16; A01N43/18; A01N43/32; A01N43/40; A01N43/58; A01N43/76; A01N43/78; A01N55/00; C07C233/64; C07D213/82; C07D231/14; C07D263/34; C07D277/20; C07D277/32; C07D307/68; C07D309/28; C07D333/38; C07D335/02; A01N37/22; C07D213/82; C07D327/08; A01N37/22; A01N43/08; A01N43/10; A01N43/16; A01N43/18; A01N43/32; A01N43/40; A01N43/58; A01N43/76; A01N43/78; A01N55/00; C07D213/82; C07D231/14; C07D263/34; C07D277/32; C07D307/68; C07D309/28; C07D327/08; C07D333/38; C07D335/02

- European:

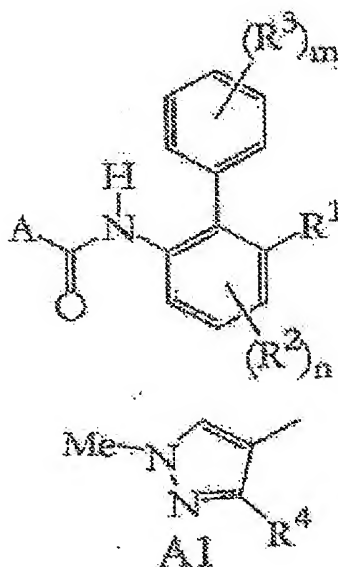
Application number: JP20000118399 20000420

Priority number(s): JP20000118399 20000420

Abstract of JP 2001302605 (A)

PROBLEM TO BE SOLVED: To obtain a compound having an excellent plant pest control effect.

SOLUTION: This biphenyl compound is expressed by general formula [wherein R¹ expresses a 1-10C alkyl, a-10C haloalkyl; n expresses 0-3 integer; R² expresses fluorine; m expresses 0-5 integer; R³ is the same or different and expresses a halogen, a 1-10C alkyl; A expresses a group expressed by the following A1 wherein R⁴ expresses a halogen or the like].



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PARTIAL TRANSLATION OF JAPANESE UNEXAMINED PATENT
PUBLICATION (Reference 3)

(Kokai) No. 2001-302605

Title of the invention: BIPHENYL COMPOUND AND ITS USE

Application No.: 2000-119399

Filing date: April 20, 2000

Publication date: 2001-10-31

Inventor(s): SAKAGUCHI YASUSHI

Applicant(s): SUMITOMO CHEMICAL CO

The specification

[0015]

When the present compound is used as an active ingredient of a fungicide, it may be used without other ingredients; however, it is usually formulated by mixing a solid carrier, liquid carrier, surfactant, or the other formulation auxiliary to emulsifiable concentrates, wettable powders, water dispersible granules, emulsion formulations, flowables, dusts, granules and so on. These formulations usually contain 0.1 to 90% by weight of the present compound as an active ingredient. Examples of the solid carrier include minerals such as kaolin clay, attapulgite clay, bentonite, montmorillonite, terra alba, pyrophyllite, talc, diatomaceous earth, calcite and so on; natural organisms such as corncob powder, walnut shell powder and so on; synthetic organisms such as urea and so on; and salts such as calcium carbonate, ammonium sulfate and so on. Examples of the liquid carrier include aromatic hydrocarbons such as xylene, alkylbenzene, methylnaphthalene and so on; alcohols such as isopropanol,

ethylene glycol, propylene glycol, cellosolve and so on; ketones such as acetone, cyclohexanone, isophorone and so on; vegetable oils such as soybean oil, cotton seed oil and so on; petroleum aliphatic hydrocarbons; esters; dimethyl sulfoxide; acetonitrile; and water. Examples of the surfactant include anionic surfactants such as alkylsulfate ester salts, alkylarylsulfonic acid salts, dialkylsulfosuccinic acid salts, polyoxyethylene alkyl aryl ether phosphate ester salts, ligninsulfonic acid salts, naphthalenesulfonate formaldehyde condensate and so on; and nonionic surfactants such as polyoxyethylene alkyl aryl ether, polyoxyethylene alkyl polyoxypropylene block copolymer, sorbitan fatty acid ester and so on. Examples of the formulation auxiliary include water soluble polymers such as polyvinyl alcohol, polyvinylpyrrolidone and so on; gum arabic; alginic acid and its salts; polysaccharides such as CMC (carboxymethylcellulose) and xanthan gum; inorganic materials such as aluminum magnesium silicate and alumina sol; preservatives; coloring agents; and stabilizers such as PAP (isopropyl acid phosphate) and BHT. When the present compound is used for controlling plant diseases, it is typically applied by the methods of foliar treatment, soil treatment and so on.

[0016]

The application dosage can be varied according to the type of the protected plant, the type of the disease to be controlled, degree of affection by the disease, formulation type, application method, time of application, weather conditions and so on, and it is usually 0.01 to 50 g, preferably 0.05 to 10 g per one hectare. In a case that

emulsifiable concentrate, wettable powder, suspensible concentrate or the like is diluted with water and applied, the application concentration of the active ingredient is 0.0001 to 3% by weight, preferably 0.0005 to 1% by weight. Dusts, granules and the like are applied without dilution as they are.

[0017]

The present compound can be used as an effective ingredient of fungicide for controlling plant diseases in upland field, paddy field, orchard, tea field, pasture, lawn and the like. It may occasionally be expected to increase the fungicidal effect by mixing with the other fungicide. Examples of the fungicide include azole fungicidal compounds such as propiconazole, triadimenol, prochloraz, penconazole, tebuconazole, flusilazole, diniconazole, bromuconazole, epoxyconazole, difenoconazole, cyproconazole, metconazole, triflumizole, tetraconazole, myclobutanil, fenbuconazole, hexaconazole, fluquinconazole, triticonazole, bitertanol, imazalil, flutriafol and so on; cyclic amine fungicidal compounds such as fenpropimorph, tridemorph, fenpropidin and so on; benzimidazole fungicidal compounds such as carbendazim, benomyl, thiabendazole, thiophanate-methyl and so on; procymidone; cyprodinil; pyrimethanil; diethofencarb; thiuram; fluazinam; mancozeb; iprodione; vinclozolin; chlorothalonil; captan; mepanipyrim; fenpiclonil; fludioxonil; dichlorfluand; folpet; kresoxim-methyl; azoxystrobin; trifloxystrobin; picoxystrobin; pyraclostrobin; N-methyl-.alpha.-methoxyimin-2-[(2,5-dimethylphenoxy)methyl]phenylacetamide; spiroxamine; quinixyfen; fenhexamide; famoxadone;

fenamidone (RP-407213); iprovalicarb; and the like.

[0018] The present compound may be used together with the other agricultural or horticultural insecticide, acaricide, nematocide, herbicide, plant growth regulator and fertilizer. It may be blended in advance of the application. Examples of the insecticide, acaricide and nematocide include organophosphorus compounds such as fenitrothion [O,O-dimethyl O-(3-methyl-4-nitrophenyl)phosphorothioate], fenthion [O,O-dimethyl O-(3-methyl-4-(methylthio)phenyl)phosphorothioate], diazinon [O,O-diethyl O-2-isopropyl-6-methylpyrimidin-4-yl phosphorothioate], chlorpyrifos [O,O-diethyl O-3,5,6-trichloro-2-pyridyl phosphorothioate], acephate [O,S-dimethyl acetylphosphoramidethioate], methidathion [S-2,3-dihydro-5-methoxy-2-oxo-1,3,4-thiadiazol-3-ylmethyl O,O-dimethyl phosphorodithioate], disulfoton [O,O-diethyl S-2-ethylthioethyl phosphorothioate], DDVP [2,2-dichlorovinyl dimethyl phosphate], sulprofos, [O-ethyl O-4-(methylthio)phenyl S-propyl phosphorodithioate], cyanophos [O-4-cyanophenyl O,O-dimethyl phosphorothioate], dioxabenzofos [2-methoxy-4H-1,3,2-benzodioxaphosphorin-2-sulfide), dimethoate [O,O-dimethyl S-(N-methylcarbamoylmethyl)dithiophosphate], phenthoate [ethyl 2-dimethoxyphosphinothioylthio(phenyl)acetate], malathion [diethyl(dimethoxyphosphinothioylthio)succinate], trichlorfon [dimethyl 2,2,2-trichloro-1-hydroxyethylphosphonate], azinphos-methyl [S-3,4-dihydro-4-oxo-1,2,3-benzotriazin-3-ylmethyl O,O-dimethyl phosphorodithioate], monocrotophos [dimethyl (E)-1-methyl-2-(methylcarbamoyl)vinyl phosphate], ethion [O,O,O',O'-

tetraethyl S,S'-methylenebis(phosphorodithioate)],
 fosthiazate [N-(O-methyl-S-sec-butyl)phosphorylthiazolidi-
 n-2-one] and so on; carbamate compound such as BPMC [2-sec-
 butylphenyl methylcarbamate], benfuracarb [ethyl N-(2,3-
 dihydro-2,2-dimethylbenzofura- n-7-
 yloxycarbonyl(methyl)aminothio)-N-isopropyl-.beta.-
 alaninate, propoxur [2-isopropylphenyl N-methylcarbamate],
 carbosulfan [2,3-dihydro-2,2-dimethyl-7-benzo[b]furanyl N-
 dibutylaminothio-N-methylcarbamate], carbaryl [1-naphthyl
 N-methylcarbamate], methomyl [S-methyl-N-
 [(methylcarbamoyl)oxy]thioacetoimide], ethiofencarb [2-
 (ethylthiomethyl)phenyl methylcarbamate], aldicarb [2-
 methyl-2-(methylthio)propionaldehyde O-
 methylcarbamoyloxime], oxamyl [N,N-dimethyl-2-
 methylcarbamoyloxyimino-2-(methylthio)acetamide],
 fenothiocarb [S-4-phenoxybutyl-N,N-dimethylthiocarbamate]
 and so on; pyrethroid compounds such as etofenprox [2-(4-
 ethoxyphenyl)-2-methylpropyl 3-phenoxybenzyl ether],
 fenvalerate [(RS)-.alpha.-cyano-3-phenoxybenzyl (RS)-2-(4-
 chlorophenyl)-3-methylbutyrate], esfenvalerate [(S)-
 .alpha.-cyano-3-phenoxybenzyl (S)-2-(4-chlorophenyl)-3-
 methylbutyrate], fenpropathrin [(RS)-.alpha.-cyano-3-
 phenoxybenzyl 2,2,3,3-tetramethylcyclopropanecarboxylate],
 cypermethrin [(RS)-.alpha.-cyano-3-phenoxybenzyl (1RS,3RS)-
 3-(2,2-dichlorovinyl)-2,2-d-
 imethylcyclopropanecarboxylate], permethrin [3-
 phenoxybenzyl (1RS, 3RS)-3-(2,2-dichlorovinyl)-2,2-
 dimethylcyclopropanecarboxylate], cyhalothrin [(RS)-
 .alpha.-cyano-3-phenoxybenzyl (Z)-(1RS,3RS)-3-(2-chloro- -
 3,3,3-trifluoropropenyl)-2,2-
 dimethylcyclopropanecarboxylate], deltamethrin [(S)-

.alpha.-cyano-m-phenoxybenzyl (1R,3R)-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropanecarboxylate], cycloprothrin [(RS)-.alpha.-cyano-3-phenoxybenzyl (RS)-2,2-dichloro-1-(4-ethoxyphenyl)cyclopropanecarboxylate], fluvalinate [.alpha.-cyano-3-phenoxybenzyl N-(2-chloro-.alpha.,.alpha.,.alpha.-trifluoro-p-tolyl)-D-valinate], bifenthrin [2-methylbiphenyl-3-ylmethyl (Z)-(1RS)-cis-3-(2-chloro-3,3,3-trifluoroprop-1-enyl)-2,2-dimethylcyclopropanecarboxylate], acrinathrin [cyano(3-phenoxyphenyl)methyl (1R-{1.alpha.(S*),3.alpha.(Z)})-2,2-dimethyl-1-3-[3-oxo-3-(2,2,2-trifluoro-1-(trifluoromethyl)ethoxy-1-propenyl)cyclopropanecarboxylate], 2-methyl-2-(4-bromodifluoromethoxyphenyl)propyl 3-phenoxybenzyl ether, tralomethrin [(S)-.alpha.-cyano-3-phenoxybenzyl (1R)-cis-3-(1,2,2,2-tetrabromoethyl)-2,2-dimethylcyclopropanecarboxylate]-, silafluofen [4-ethoxyphenyl(3-(4-fluoro-3-phenoxyphenyl)propyl)dimethylsilane] and so on; thiadiazine derivatives such as buprofezin (2-t-butylimino-3-isopropyl-5-phenyl-1,3,5-thiadiazinan-4-one) and so on; nitroimidazolidine derivatives; nereistoxin derivatives such as cartap (S,S'-(2-dimethylaminotrimethylene) bis(thiocarbamate)), thiocyclam [N,N-dimethyl-1,2,3-trithian-5-ylamine], bensultap [S,S'-2-dimethylaminotrimethylene di(benzenethiosulfonate)] and so on; N-cyanoamidine derivatives such as N-cyano-N'-methyl-N'-(6-chloro-3-pyridylmethyl)acetamidine and so on; chlorinated hydrocarbon compounds such as endosulfan [6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-6,9-methano--2,4,3-benzodioxathiepine oxide], .gamma.-BHC (1,2,3,4,5,6-

hexachlorocyclohexane), 1,1-bis(chlorophenyl)-2,2,2-trichloroethanol and so on; benzoylphenylurea compounds such as chlorfluazuron [1-(3,5-dichloro-4-(3-chloro-5-trifluoromethylpyridin-2-yloxy)phenyl)-3-(2,6-difluorobenzoyl)urea], teflubenzuron [1-(3,5-dichloro-2,4-difluorophenyl)-3-(2,6-difluorobenzoyl)urea], flufenoxuron [1-(4-(2-chloro-4-trifluoromethylphenoxy)-2-fluorophenyl)-3-(2,6-difluorobenzoyl)urea] and so on; formamidine derivatives such as amitraz [N,N'[(methylimino)dimethylidene]di-2,4-xylidine], chlordimeform [N'-(4-chloro-2-methylphenyl)-N,N-dimethylmethanimidamide] and so on; thiourea derivatives such as diafenthiuron [N-(2,6-diisopropyl-4-phenoxyphenyl)-N'-t-butylcarbodiimide] and so on; phenylpyrazole compounds; tebufenozide [N-t-butyl-N'-(4-ethylbenzoyl)-3,5-dimethylbenzohydrazide]; 4-bromo-2-(4-chlorophenyl)-1-ethoxymethyl-5-trifluoromethylpyrrole-3-carbonitrile; bromopropylate [isopropyl 4,4'-dibromobenzilate]; tetradifon [4-chlorophenyl 2,4,5-trichlorophenyl sulfone]; chinomethionat [S,S-6-methylquinoxalin-2,3-diyl dithiocarbonate]; propargite [2-(4-t-butylphenoxy)cyclohexyl prop-2-yl sulfite]; fenbutatin oxide [bis[tris(2-methyl-2-phenylpropyl)tin]oxide]; hexythiazox [(4RS,5RS)-5-(4-chlorophenyl)-N-chlorohexyl-4-methyl-2-oxo-1,3-thiazolidine-3-carboxamide]; clofentezine [3,6-bis(2-chlorophenyl)-1,2,4,5-tetrazine]; pyridathioben [2-t-butyl-5-(4-t-butylbenzylthio)-4-chloropyridazin-3(2H)-one]; fenpyroximate [t-butyl (E)-4-[(1,3-dimethyl-5-phenoxy-pyrazol-4-yl)m-ethyleneamino]oxymethyl]benzoate]; tebufenpyrad [N-4-(t-butylbenzyl)-4-chloro-3-ethyl-1-methyl-5-pyrazolecarboxamide]; polynactin complex [tetranactin,

dinactin, trinactin]; milbemectin; avermectin; ivermectin; azadirachtin [AZAD]; pyrimidifen [5-chloro-N-[2-(4-(2-ethoxyethyl)-2,3-di-methylphenoxy)ethyl]-6-ethylpyrimidin-4-amine]; and pymetrozine [2,3,4,5-tetrahydro-3-oxo-4-[(pyridine-3-yl)methyleneamino]-6-methyl-1,2,4-triazine].

[0019]

Examples of the plant diseases to be controlled by the present compound include *Pyricularia oryzae* and *Cochliobolus miyabeanus* and *Rhizoctonia solani* of rice; *Erysiphe graminis*, *Gibberella zeae*, *Puccinia striiformis*, *P. graminis*, *P. recondita*, *P. hordei*, *Typhula* sp., *Micronectriella nivalis*, *Ustilago tritici*, *U. nuda*, *Tilletia caries*, *Pseudocercospora herpotrichoides*, *Rhynchosporium secalis*, *Septoria tritici* and *Leptosphaeria nodorum*, of wheat and barley; *Diaporthe citri*, *Elsinoe fawcetti*, *Penicillium digitatum* and *P. italicum* of citrus; *Sclerotinia mali*, *Valsa mali*, *Podosphaera leucotricha*, *Alternaria mali* and *Venturia inaequalis* of apple; *Venturia nashicola*, *V. pirina*, *Alternaria kikuchiana* and *Gymnosporangium haraeae* of pear; *Sclerotinia cinerea*, *Cladosporium carpophilum* and *Phomopsis* sp. of peach; *Elsinoe ampelina*, *Glomerella cingulata*, *Uncinula necator*, *Phakopsora ampelopsidis*, *Guignardia bidwellii* and *Plasmopara viticola*, of grape; *Gloeosporium kaki*, *Cercospora kaki* and *Mycosphaerella nawae* of Japanese persimmon; *Colletotrichum lagenarium*, *Sphaerotheca fuliginea*, *Mycosphaerella melonis*, *Fusarium oxysporum*, *Pseudoperonospora cubensis*, *Phytophthora* sp. and *Pythium* sp. of gourd; *Alternaria solani*; *Cladosporium fulvum* and *Phytophthora infestans* of tomato; *Phomopsis*

vexans and Erysiphe cichoracearum, of eggplant; Alternaria japonica and Cercospora brassicae of Cruciferae vegetables; Puccinia allii of leek; Cercospora kikuchii, Elsinoe glycines and Diaporthe phaseolorum var. sojae of soybean; Colletotrichum lindemthianum of kidney bean; Cercospora personata and Cercospora arachidicola of peanut; Erysiphe pisi of pea; Alternaria solani and Phytophthora infestans of potato; Sphaerotheca humuli of strawberry; Exobasidium reticulatum and Elsinoe leucospila of tea; Alternaria longipes, Erysiphe cichoracearum, Colletotrichum tabacum, Peronospora tabacina and Phytophthora nicotianae of tobacco; Cercospora beticola of sugar beet; Diplocarpon rosae and Sphaerotheca pannosa of rose; Septoria chrysanthemi-indici and Puccinia horiana of chrysanthemum; and Botrytis cinerea and Sclerotinia sclerotiorum of various crops.

[0041]

Tables 1 to 21 represent examples of the present compounds, such as those of the general formula as follows:

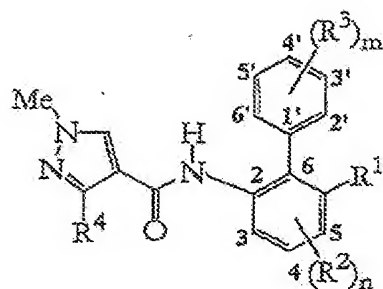


Table 1

No.	R ¹	(R ²) _n	(R ³) _m	R ⁴
1-1	Me	-	-	CF ₃
1-2	Me	-	2'-F	CF ₃
1-3	Me	-	3'-F	CF ₃
1-4	Me	-	3'-Cl	CF ₃
1-5	Me	-	4'-F	CF ₃
1-6	Me	-	4'-Cl	CF ₃
1-7	Me	-	4'-Br	CF ₃
1-8	Me	-	4'-Me	CF ₃
1-9	Me	-	4'-CF ₃	CF ₃
1-10	Me	-	4'-OMe	CF ₃
1-11	Me	-	4'-OCF ₃	CF ₃
1-12	Me	-	4'-SMe	CF ₃
1-13	Me	-	3', 4'-diCl	CF ₃
1-14	Me	-	3'-Me-4'-Cl	CF ₃
1-15	Me	-	3'-F-4'-Cl	CF ₃
1-16	Me	-	3'-Cl-4'-CF ₃	CF ₃
1-17	Me	-	2', 4'-diF	CF ₃
1-18	Me	-	2', 5'-diF	CF ₃
1-19	Me	-	4'-SiMe ₃	CF ₃
1-20	Me	-	-	CHF ₂
1-21	Me	-	4'-F	CHF ₂
1-22	Me	-	4'-Cl	CHF ₂
1-23	Me	-	4'-Me	CHF ₂
1-24	Me	-	4'-CF ₃	CHF ₂
1-25	Et	-	-	CF ₃

Table 2

No.	R ¹	(R ²) _n	(R ³) _m	R ⁴
1-26	Et	-	4'-F	CF ₃
1-27	Et	-	4'-Cl	CF ₃
1-28	Et	-	4'-Me	CF ₃
1-29	Et	-	4'-CF ₃	CF ₃
1-30	CF ₃	-	-	CF ₃
1-31	CF ₃	-	4'-F	CF ₃
1-32	CF ₃	-	4'-Cl	CF ₃
1-33	CF ₃	-	4'-Me	CF ₃
1-34	CF ₃	-	4'-CF ₃	CF ₃
1-35	o-Pr	-	-	CF ₃
1-36	o-Pr	-	4'-F	CF ₃
1-37	o-Pr	-	4'-Cl	CF ₃
1-38	o-Pr	-	4'-Me	CF ₃
1-39	o-Pr	-	4'-CF ₃	CF ₃
1-40	CH=CH ₂	-	-	CF ₃
1-41	CH=CH ₂	-	4'-F	CF ₃
1-42	CH=CH ₂	-	4'-Cl	CF ₃
1-43	CH=CH ₂	-	4'-Me	CF ₃
1-44	CH=CH ₂	-	4'-CF ₃	CF ₃
1-45	-C≡CH	-	-	CF ₃
1-46	-C≡CH	-	4'-F	CF ₃
1-47	-C≡CH	-	4'-Cl	CF ₃
1-48	-C≡CH	-	4'-Me	CF ₃
1-49	-C≡CH	-	4'-CF ₃	CF ₃
1-50	Na	4-F	-	CF ₃

Table 3

No.	R ¹	(R ²) _n	(R ³) _m	R ⁴
1-51	Me	4-F	4'-F	CF ₃
1-52	Me	4-F	4'-Cl	CF ₃
1-53	Me	4-F	4'-Me	CF ₃
1-54	Me	4-F	4'-CF ₃	CF ₃
1-55	OMe	-	-	CF ₃
1-56	OMe	-	2'-F	CF ₃
1-57	OMe	-	3'-F	CF ₃
1-58	OMe	-	3'-Cl	CF ₃
1-59	OMe	-	4'-F	CF ₃
1-60	OMe	-	4'-Cl	CF ₃
1-61	OMe	-	4'-Br	CF ₃
1-62	OMe	-	4'-Me	CF ₃
1-63	OMe	-	4'-CF ₃	CF ₃
1-64	OMe	-	4'-OMe	CF ₃
1-65	OMe	-	4'-OCF ₃	CF ₃
1-66	OMe	-	4'-OMe	CF ₃
1-67	OMe	-	3',4'-diCl	CF ₃
1-68	OMe	-	3'-Me-4'-Cl	CF ₃
1-69	OMe	-	3'-F-4'-Cl	CF ₃
1-70	OMe	-	3'-Cl-4'-CF ₃	CF ₃
1-71	OMe	-	2',4'-diF	CF ₃
1-72	OMe	-	2',5'-diF	CF ₃
1-73	OMe	-	4'-SiMe ₃	CF ₃
1-74	Ol-Pr	-	-	CF ₃
1-75	Ol-Pr	-	4'-F	CF ₃

Table 4

No.	R ¹	(R ²) _n	(R ³) _m	R ⁴
1-76	Ol-Pr	-	4'-Cl	CF ₃
1-77	Ol-Pr	-	4'-Me	CF ₃
1-78	Ol-Pr	-	4'-CF ₃	CF ₃
1-79	OCF ₃	-	-	CF ₃
1-80	OCF ₃	-	4'-F	CF ₃
1-81	OCF ₃	-	4'-Cl	CF ₃
1-82	OCF ₃	-	4'-Me	CF ₃
1-83	OCF ₃	-	4'-CF ₃	CF ₃
1-84	Cl	-	-	CF ₃
1-85	Cl	-	2'-F	CF ₃
1-86	Cl	-	3'-F	CF ₃
1-87	Cl	-	3'-Cl	CF ₃
1-88	Cl	-	4'-F	CF ₃
1-89	Cl	-	4'-Cl	CF ₃
1-90	Cl	-	4'-Br	CF ₃
1-91	Cl	-	4'-Me	CF ₃
1-92	Cl	-	4'-CF ₃	CF ₃
1-93	Cl	-	4'-OMe	CF ₃
1-94	Cl	-	4'-OCF ₃	CF ₃
1-95	Cl	-	4'-SMe	CF ₃
1-96	Cl	-	3',4'-diCl	CF ₃
1-97	Cl	-	3'-Me-4'-Cl	CF ₃
1-98	Cl	-	3'-F-4'-Cl	CF ₃
1-99	Cl	-	3'-Cl-4'-CF ₃	CF ₃
1-100	Cl	-	2',4'-diF	CF ₃

Table 5

No.	R ¹	(R ²) _n	(R ³) _m	R ⁴
1-101	Cl	-	2',5'-diF	CF ₃
1-102	Cl	-	4'-SiMe ₃	CF ₃

the general formula as follows:

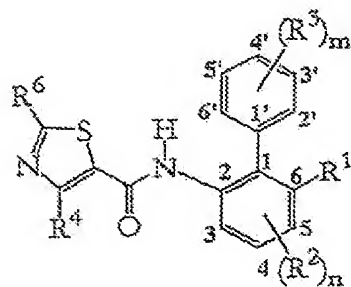


Table 6

NO.	R ¹	(R ²) _n	(R ³) _m	R ⁴	R ⁵
2-1	Me	-	-	CF ₃	Me
2-2	Me	-	2'-F	CF ₃	Me
2-3	Me	-	3'-F	CF ₃	Me
2-4	Me	-	3'-Cl	CF ₃	Me
2-5	Me	-	4'-F	CF ₃	Me
2-6	Me	-	4'-Cl	CF ₃	Me
2-7	Me	-	4'-Br	CF ₃	Me
2-8	Me	-	4'-Me	CF ₃	Me
2-9	Me	-	4'-CF ₃	CF ₃	Me
2-10	Me	-	4'-OMe	CF ₃	Me
2-11	Me	-	4'-OCF ₃	CF ₃	Me
2-12	Me	-	4'-SMe	CF ₃	Me
2-13	Me	-	3', 4'-diCl	CF ₃	Me
2-14	Me	-	3'-Me-4'-Cl	CF ₃	Me
2-15	Me	-	3'-F-4'-Cl	CF ₃	Me
2-16	Me	-	3'-Cl-4'-CF ₃	CF ₃	Me
2-17	Me	-	2', 4'-diF	CF ₃	Me
2-18	Me	-	2', 5'-diF	CF ₃	Me
2-19	Me	-	4'-SiMe ₃	CF ₃	Me
2-20	Me	-	-	CHF ₃	Me
2-21	Me	-	4'-F	CHF ₃	Me
2-22	Me	-	4'-Cl	CHF ₃	Me
2-23	Me	-	4'-Me	CHF ₃	Me
2-24	Me	-	4'-CF ₃	CHF ₃	Me
2-25	Et	-	-	CF ₃	Me

Table 7

No.	R ¹	(R ²) _n	(R ³) _m	R ⁴	R ⁵
2-26	Et	-	4'-F	CF ₃	Me
2-27	Et	-	4'-Cl	CF ₃	Me
2-28	Et	-	4'-Me	CF ₃	Me
2-29	Et	-	4'-CF ₃	CF ₃	Me
2-30	CF ₃	-	-	CF ₃	Me
2-31	CF ₃	-	4'-F	CF ₃	Me
2-32	CF ₃	-	4'-Cl	CF ₃	Me
2-33	CF ₃	-	4'-Me	CF ₃	Me
2-34	CF ₃	-	4'-CF ₃	CF ₃	Me
2-35	n-Pr	-	-	CF ₃	Me
2-36	n-Pr	-	4'-F	CF ₃	Me
2-37	n-Pr	-	4'-Cl	CF ₃	Me
2-38	n-Pr	-	4'-Me	CF ₃	Me
2-39	n-Pr	-	4'-CF ₃	CF ₃	Me
2-40	CH=CH ₂	-	-	CF ₃	Me
2-41	CH=CH ₂	-	4'-F	CF ₃	Me
2-42	CH=CH ₂	-	4'-Cl	CF ₃	Me
2-43	CH=CH ₂	-	4'-Me	CF ₃	Me
2-44	CH=CH ₂	-	4'-CF ₃	CF ₃	Me
2-45	-C≡CH	-	-	CF ₃	Me
2-46	-C≡CH	-	4'-F	CF ₃	Me
2-47	-C≡CH	-	4'-Cl	CF ₃	Me
2-48	-C≡CH	-	4'-Me	CF ₃	Me
2-49	-C≡CH	-	4'-CF ₃	CF ₃	Me
2-50	Me	4-F	-	CF ₃	Me

Table 8

No.	R ¹	(R ²) _n	(R ³) _m	R ⁴	R ⁵
2-51	Me	4-F	4'-F	CF ₃	Me
2-52	Me	4-F	4'-Cl	CF ₃	Me
2-53	Me	4-F	4'-Me	CF ₃	Me
2-54	Me	4-F	4'-CF ₃	CF ₃	Me
2-54	Me	4-F	4'-CF ₃	CF ₃	Me
2-56	OMe	-	2'-F	CF ₃	Me
2-57	OMe	-	3'-F	CF ₃	Me
2-58	OMe	-	3'-Cl	CF ₃	Me
2-59	OMe	-	4'-F	CF ₃	Me
2-60	OMe	-	4'-Cl	CF ₃	Me
2-61	OMe	-	4'-Br	CF ₃	Me
2-62	OMe	-	4'-Me	CF ₃	Me
2-63	OMe	-	4'-CF ₃	CF ₃	Me
2-64	OMe	-	4'-OMe	CF ₃	Me
2-65	OMe	-	4'-OCF ₃	CF ₃	Me
2-66	OMe	-	4'-SMe	CF ₃	Me
2-67	OMe	-	3', 4'-diCl	CF ₃	Me
2-68	OMe	-	3'-Me-4'-Cl	CF ₃	Me
2-69	OMe	-	3'-F-4'-Cl	CF ₃	Me
2-70	OMe	-	3'-Cl-4'-CF ₃	CF ₃	Me
2-71	OMe	-	2', 4'-diF	CF ₃	Me
2-72	OMe	-	2', 5'-diF	CF ₃	Me
2-73	OMe	-	4'-SiMe ₃	CF ₃	Me
2-74	Oi-Pr	-	-	CF ₃	Me
2-75	Oi-Pr	-	4'-F	CF ₃	Me

Table 9

No.	R ¹	(R ²) _n	(R ³) _m	R ⁴	R ⁵
2-76	Oi-Pr	-	4'-Cl	CF ₃	Me
2-77	Oi-Pr	-	4'-Me	CF ₃	Me
2-78	Oi-Pr	-	4'-CF ₃	CF ₃	Me
2-79	OCF ₃	-	-	CF ₃	Me
2-80	OCF ₃	-	4'-F	CF ₃	Me
2-81	OCF ₃	-	4'-Cl	CF ₃	Me
2-82	OCF ₃	-	4'-Me	CF ₃	Me
2-83	OCF ₃	-	4'-CF ₃	CF ₃	Me
2-84	Cl	-	-	CF ₃	Me
2-85	Cl	-	2'-F	CF ₃	Me
2-86	Cl	-	3'-F	CF ₃	Me
2-87	Cl	-	3'-Cl	CF ₃	Me
2-88	Cl	-	4'-F	CF ₃	Me
2-89	Cl	-	4'-Cl	CF ₃	Me
2-90	Cl	-	4'-Br	CF ₃	Me
2-91	Cl	-	4'-Me	CF ₃	Me
2-92	Cl	-	4'-CF ₃	CF ₃	Me
2-93	Cl	-	4'-OMe	CF ₃	Me
2-94	Cl	-	4'-OCF ₃	CF ₃	Me
2-95	Cl	-	4'-SMe	CF ₃	Me
2-96	Cl	-	3',4'-diCl	CF ₃	Me
2-97	Cl	-	3'-Me-4'-Cl	CF ₃	Me
2-98	Cl	-	3'-F-4'-Cl	CF ₃	Me
2-99	Cl	-	3'-Cl-4'-CF ₃	CF ₃	Me
2-100	Cl	-	2',4'-diF	CF ₃	Me

Table 10

2-101	Cl	-	2',5'-diF	CF ₃	Me
2-102	Cl	-	4'-SiMe ₃	CF ₃	Me

the formula as follows:

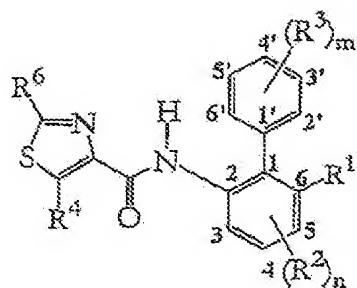


Table 11

NO.	R ¹	(R ²) _n	(R ²) _m	R ⁴	R ⁵
3-1	Me	-	-	CF ₃	Me
3-2	Me	-	4'-F	CF ₃	Me
3-3	Me	-	4'-Cl	CF ₃	Me
3-4	Me	-	4'-Me	CF ₃	Me
3-5	Me	-	4'-CF ₃	CF ₃	Me
3-6	OMe	-	-	CF ₃	Me
3-7	OMe	-	4'-F	CF ₃	Me
3-8	OMe	-	4'-Cl	CF ₃	Me
3-9	OMe	-	4'-Me	CF ₃	Me
3-10	OMe	-	4'-CF ₃	CF ₃	Me
3-11	Cl	-	-	CF ₃	Me
3-12	Cl	-	4'-F	CF ₃	Me
3-13	Cl	-	4'-Cl	CF ₃	Me
3-14	Cl	-	4'-Me	CF ₃	Me
3-15	Cl	-	4'-CF ₃	CF ₃	Me

the formula as follows:

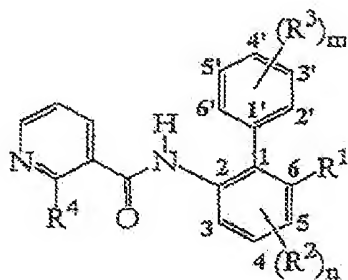


Table 12

No.	R ¹	(R ²) _n	(R ³) _m	R ⁴
4-1	Me	-	-	Cl
4-2	Me	-	4'-F	Cl
4-3	Me	-	4'-Cl	Cl
4-4	Me	-	4'-Me	Cl
4-5	Me	-	4'-CF ₃	Cl
4-6	Me	-	4'-OMe	Cl
4-7	Me	-	4'-OCF ₃	Cl
4-8	Me	-	4'-SMe	Cl
4-9	Me	-	-	CF ₃
4-10	Me	-	4'-F	CF ₃
4-11	Me	-	4'-Cl	CF ₃
4-12	Me	-	4'-Me	CF ₃
4-13	Me	-	4'-CF ₃	CF ₃
4-14	OMe	-	-	Cl
4-15	OMe	-	4'-F	Cl
4-16	OMe	-	4'-Cl	Cl
4-17	OMe	-	4'-Me	Cl
4-18	OMe	-	4'-CF ₃	Cl
4-19	Cl	-	-	Cl
4-20	Cl	-	4'-F	Cl
4-21	Cl	-	4'-Cl	Cl
4-22	Cl	-	4'-Me	Cl
4-23	Cl	-	4'-CF ₃	Cl

the formula as follows:

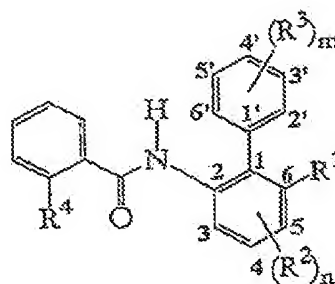


Table 13

NO.	R ¹	(R ²) _n	(R ³) _m	R ⁴
5-1	Me	-	-	CF ₃
5-2	Me	-	4'-F	CF ₃
5-3	Me	-	4'-Cl	CF ₃
5-4	Me	-	4'-Me	CF ₃
5-5	Me	-	4'-CF ₃	CF ₃
5-6	OMe	-	-	CF ₃
5-7	OMe	-	4'-F	CF ₃
5-8	OMe	-	4'-Cl	CF ₃
5-9	OMe	-	4'-Me	CF ₃
5-10	OMe	-	4'-CF ₃	CF ₃
5-11	Cl	-	-	CF ₃
5-12	Cl	-	4'-F	CF ₃
5-13	Cl	-	4'-Cl	CF ₃
5-14	Cl	-	4'-Me	CF ₃
5-15	Cl	-	4'-CF ₃	CF ₃

the formula as follows:

